Topic 6b Example

Recall: Vitamin C vs. the Common Cold

Variables:

Response: $Y = 1$ if caught cold, $Y = 0$ if didn't

Explanatory: X_1 – treatment (0 = placebo, 1 = vitamin C)

X_2 – stress rating (Measured based on a test out of 10 with 10 being the most stress.)

Analyse the data to see whether the probability of getting a cold is associated with vitamin C consumption and stress level.

1. Consider only stress rating as the explanatory variable. The following output was obtained in SPSS.

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	STRESS	.780	.071	121.862	1	.000	2.181
	Constant	-3.359	.407	68.057	1	.000	.035

a. Variable(s) entered on step 1: STRESS.

a) Write the estimated logistic regression equation.
b) What is the logistic function?
c) Use the logistic function to estimate the chance of getting a cold for an individual with stress rating equal to 5.
d) What are the odds of getting a cold for an individual with stress rating = 5?
e) What is the odds ratio of getting a cold with stress rating equal to 9 vs. stress rating equal to 5?
f) Use Wald's test to see if stress rating affects probability of getting a cold.

2. Now fit the model using both explanatory variables. Note: treatment is categorical.

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	STRESS	1.420	.114	156.420	1	.000	4.135
	TREAT	-2.933	.308	90.672	1	.000	.053
	Constant	-5.546	.542	104.524	1	.000	.004

a. Variable(s) entered on step 1: STRESS, TREAT.

a) Write the estimated logistic regression equation.
b) What is the logistic function?
c) Use the logistic function to estimate the chance of getting a cold for an individual taking vitamin C that has stress rating equal to 5.
d) What are the odds of getting a cold for an individual taking vitamin C that has stress rating equal to 5?
e) What is the odds ratio of getting a cold for an individual taking vitamin C vs. an individual not taking vitamin C, after taking into account stress rating?
f) Use Wald's test to see if taking vitamin C reduces the probability of getting a cold, after taking into account stress rating.